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The Implications of ICT Integration on Resource Allocation and Administrative Efficiency in Primary Schools in Mbeya City, Tanzania

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ABSTRACT

This study examined the implications of Information and Communication Technology (ICT) integration on resource allocation and administrative efficiency in public primary schools in Mbeya City, Tanzania. Guided by the Technology Acceptance Model and Connectivism Theory, the research employed a cross-sectional design using mixed methods. A sample of 90 participants 45 teachers, 45 pupils, and 9 school administrators was purposively selected from three schools. Quantitative data were collected through structured questionnaires and analyzed using SPSS Version 21 to generate descriptive statistics, while qualitative data from interviews were thematically analyzed. Findings revealed that ICT integration significantly improved administrative efficiency, accuracy in resource allocation, and transparency. ICT-based record-keeping enhanced accountability, data management systems facilitated timely reporting, and communication tools strengthened collaboration among staff. Decision-support systems enabled evidence-based monitoring of teaching and learning, promoting efficiency and equitable resource distribution. However, challenges such as inadequate infrastructure, limited teacher training, and unreliable internet connectivity constrained full ICT utilization. The study concluded that ICT integration fosters improved management, collaboration, and accountability in school administration. It recommends sustained investment in ICT infrastructure, continuous professional development for teachers and administrators, and policy frameworks to strengthen ICT-based management and decision-making in primary education.

Keywords: ICT Integration, Resource Allocation, School Administration, Management, primary education.

Introduction

The integration of Information and Communication Technology (ICT) in education has significantly influenced how resources are allocated and managed within primary schools. Globally, ICT integration is seen as a catalyst for educational reform, promoting efficiency in both teaching and administration (Raharjo, Sari, & Nugroho, 2023; Malik, 2018). Governments and institutions are increasingly prioritizing investments in ICT infrastructure, teacher training, and curriculum digitalization to enhance learning outcomes (Baharuldin, Ismail, & Ayub, 2019; ILO, 2023). In Tanzania, key policies such as the *Education and Training Policy (ETP 2014, 2023 Edition)* and the *ICT Policy for Basic Education (2007)* emphasize ICT as essential for quality education delivery, improved school management, and teacher competency development (Makinde, Adebayo, & Mkumbo, 2023). These frameworks have led to substantial resource allocation toward acquiring ICT tools, expanding internet connectivity, and establishing professional development programs. However, implementation disparities persist, especially in rural and semi-urban areas like Mbeya City, where inadequate infrastructure, electricity, and teacher readiness hinder full realization of ICT objectives (Daudi & Nzilano, 2019).

The implications of ICT integration extend beyond technological access to influencing how schools plan, distribute, and utilize resources. The Tanzanian government's initiatives such as the 2023 distribution of over 17,000 desktop computers and 10,000 laptops, alongside broadband expansion through the *National ICT Broadband Backbone (NICTBB)* reflect an increasing prioritization of ICT in budgetary decisions (The Citizen, 2023). ICT has improved administrative efficiency by digitizing record management, financial planning, and communication systems (Hamad, 2018), yet disparities remain as 80% of schools still lack electricity or internet access (The Citizen, 2022). Moreover, the absence of technical support and limited teacher training continue to affect the equitable allocation of ICT resources (Kassim, 2024). Comparative experiences from Rwanda and Malaysia demonstrate that sustained investment in teacher competence and infrastructure is key to achieving meaningful ICT integration (ILO, 2023; Baharuldin et al., 2019). Overall, while Tanzania's policies signal a clear commitment to ICT-driven educational improvement, effective resource allocation remains a critical challenge shaping the success of ICT integration in primary schools.

The introduction of ICT in schools has significantly influenced resource allocation, particularly in budgeting, material utilization, and administrative efficiency. Studies by Wanjala, Khaemba, and Mukwa (2016) found that schools in Kenya using ICT systems achieved greater efficiency in financial planning and budgeting through real-time expenditure tracking, which reduced resource leakages and enhanced transparency. Similarly, Musoke (2018) in Uganda reported that digital platforms such as the *Education Management Information Systems (EMIS)* improved the management of instructional materials by minimizing wastage and duplication. These findings demonstrate that ICT promotes prudent and accountable resource management within

education systems. However, the World Bank (2018) cautioned that while ICT improves efficiency, the initial costs of adoption can be substantial, particularly in developing contexts. In Tanzania, Lwoga and Komba (2015) observed that schools often had to divert funds from other essential needs to acquire ICT tools, creating tension over resource prioritization.

Despite these challenges, research indicates that the long-term benefits of ICT integration outweigh the initial financial burdens. Mtebe and Raisamo (2014) noted that ICT-based record-keeping improved accountability and reduced redundant spending, while Agyemang (2019) emphasized that ICT investment led to lower operational costs through reduced paper usage, automation of administrative tasks, and improved communication systems. Collectively, these studies highlight that when ICT integration is implemented strategically, it enhances efficiency, transparency, and sustainability in resource allocation and management in primary schools.

Theoretical Perspectives

The study was guided by the Technology Acceptance Model (TAM), developed by Ajzen and Fishbein in 1975 and later refined by Davis, Bagozzi, and Warshaw in 1989, alongside the Connectivism Theory, advanced by Siemens in 2005 and Downes in 2008. TAM explains that perceived usefulness and perceived ease of use determine technology acceptance, emphasizing the need for investments in teacher training, technical support, and user engagement to ensure effective ICT utilization. Connectivism highlights learning through digital networks and collaboration, guiding administrators to allocate resources toward networked learning platforms, digital literacy programs, and collaborative tools. Together, these pioneering frameworks demonstrate that ICT integration influences resource planning and utilization, fostering efficient, inclusive, and sustainable technology use in primary school education.

Materials and Methods

The study was conducted at Mbeya City in the southwestern highlands of Tanzania, a rapidly growing urban center known for its economic, social, and educational significance. The city was purposively selected because of its diverse population, increasing ICT initiatives in public primary schools, and ongoing challenges related to infrastructure, teacher training, and policy implementation. Using a cross-sectional research design and a mixed-methods approach, the study collected both quantitative and qualitative data. A total of 90 participants 45 teachers, 45 students, and 9 school administrators were selected from three purposively chosen schools based on ICT infrastructure, geographical distribution, and performance variation.

Data were gathered through structured questionnaires and semi-structured interviews, supplemented by secondary sources such as policy documents and reports (Cohen et al., 2018). While the questionnaires provided measurable insights into participants' perceptions and practices, the interviews offered a deeper understanding of administrative decision-making, resource allocation, and challenges in ICT implementation. The integration of both methods enhanced the credibility and depth of the findings, providing a comprehensive perspective on ICT use and its administrative implications in primary education.

Data analysis

The study analyzed both quantitative and qualitative data to examine the implications of ICT integration on resource allocation in primary schools. Quantitative data from five-point Likert scale questionnaires were coded and analyzed using SPSS Version 21, with descriptive statistics such as frequencies, percentages, means, and standard deviations summarizing patterns in how schools allocate resources for ICT, including budgeting, instructional materials, and administrative functions. Qualitative data from semi-structured interviews were analyzed using thematic analysis to interpret administrators' experiences, challenges, and decision-making processes related to ICT resource management. Trustworthiness was ensured through triangulation, member checking, peer debriefing, and audit trails, enhancing credibility, dependability, and conformability. Reliability and validity were maintained through test-retest methods and expert reviews, while ethical standards were upheld via informed consent, confidentiality, and adherence to research guidelines. Overall, these methods provided a rigorous and ethically sound understanding of how ICT integration influences the planning, allocation, and utilization of resources in primary school settings.

Findings

ICT Integration and Resource Allocation

The study's second objective examined the role of ICT integration in school administration, recognizing that effective management of educational institutions relies on both teaching quality and robust administrative processes. ICT was identified as a transformative tool that enabled administrators to streamline operations such as record-keeping, resource allocation, performance monitoring, and decision-making, while also facilitating faster and more effective communication among staff to support a collaborative work environment. The findings, summarized in Table 6, presented respondents' perceptions of how digital tools and systems were utilized to enhance administrative functions, promote collaboration, and foster transparency and accountability, providing a basis for discussion in relation to existing literature and best practices in educational administration.

Table 1*: ICT Integration in School Administration (n = 90)*

Statement	SD (1) %	D (2) %	N (3) %	A (4) %	SA (5) %	Mean	SD
ICT-based record keeping improves the accuracy of school resource allocation.	4 (4.4)	7 (7.8)	11 (12.2)	42 (46.7)	26 (28.9)	3.88	1.05
Use of data management systems enables timely preparation of school performance reports.	3 (3.3)	8 (8.9)	14 (15.6)	41 (45.6)	24 (26.7)	3.83	1.03
ICT-based communication tools improve collaboration among administrative staff.	2 (2.2)	9 (10.0)	13 (14.4)	44 (48.9)	22 (24.4)	3.83	1.00
Decision-making support tools help in better monitoring of teaching and learning activities.	5 (5.6)	10 (11.1)	12 (13.3)	39 (43.3)	24 (26.7)	3.74	1.13
ICT-based administration enhances transparency and accountability in resource use.	3 (3.3)	7 (7.8)	15 (16.7)	38 (42.2)	27 (30.0)	3.88	1.02

Source: Field Data (2025)

The implication of ICT-based record in school resource allocation

The mean score of 3.88 indicates that respondents generally agreed that ICT-based record keeping enhances accuracy in resource allocation. From table 1, SD of 1.05 suggests moderate variability. Specifically, 46.7% of respondents agreed and 28.9% strongly agreed, while 4.4% strongly disagreed and 7.8% disagreed, with 12.2% remaining neutral. This shows that the majority of staff recognize the value of digital record-keeping systems in tracking textbooks, teaching materials, and financial resources, reducing errors and improving overall school management.

In addition to the statistical results, qualitative data from interviews helped to clarify how ICT-based record keeping and administration influenced school management and pupils' learning experiences. Teachers and pupils highlighted that the use of ICT tools improved organization, communication, and transparency, which indirectly supported teaching and learning.

A teacher from School A explained:

Using the school's ICT system to record student attendance and manage resources has made my work easier. I can quickly check which pupils have been attending regularly and plan lessons accordingly. It also helps in reporting to the head teacher without delays, and I notice that pupils respond better when they see that everything is organized and monitored. ICT has definitely improved how we manage classroom resources and support pupils' learning (Interviewed Teacher from School A, October 2025)

This response highlighted how ICT tools facilitate timely and efficient school management, ensuring that teachers can focus more on instructional planning and pupil engagement. The teacher's remarks suggested that when administrative processes are streamlined through technology, both teachers and pupils benefit from improved organization and communication.

Similarly, a pupil from School A shared their perspective:

I like that our school uses computers to keep track of attendance and resources. Teachers can see if we are coming to school regularly, and sometimes we get reminders about important activities. It makes me feel like the school is well-organized, and I try to attend classes more consistently because I know everything is being recorded properly (Interviewed Pupil from School A, October 2025)

The pupil's statement illustrated the positive effect of ICT-based administration on learners' motivation and sense of accountability. It also revealed that pupils notice and respond to systematic management practices, which can encourage better attendance and participation in school activities. The interviews from School A reinforced the quantitative findings that ICT-based record keeping and administration are important for effective school management. When properly implemented, these systems create an organized and transparent environment, enhancing both administrative efficiency and pupil engagement.

Use of data management systems on preparation of school performance reports

A mean of 3.83 reflects agreement among respondents that data management systems support timely reporting. From table 1 the SD of 1.03 indicates moderate variability. 45.6% agreed and 26.7% strongly agreed that these systems help prepare performance reports efficiently. A smaller proportion 3.3% strongly disagreed and 8.9% disagreed, while 15.6% were neutral. This demonstrates that most staff perceive these systems as beneficial for reducing delays and supporting timely decision-making in school management.

In addition to the statistical results, qualitative data from interviews helped to clarify how data management systems and ICT tools influenced school reporting and administrative communication. Teachers emphasized that these technologies enabled timely preparation of performance reports and improved collaboration among staff, which in turn supported instructional planning and decision-making.

A teacher from School C explained:

Our school uses a digital system to prepare performance reports for all classes. Before, it would take days to compile attendance, test scores, and other records manually. Now, with the data management system, I can generate reports within hours. This helps me identify which pupils need extra support and adjust my lessons accordingly. It also makes communication with the head teacher smoother because everything is available online (Interviewed Teacher from School C, October 2025)

This response highlighted the efficiency and effectiveness of ICT-based data management in supporting instructional decisions and school oversight. The teacher's remarks suggested that timely access to organized data enables more responsive teaching and enhances pupils' learning experiences.

Similarly, an Academic Teacher from School B shared their perspective:

ICT communication tools have greatly improved how we collaborate. We share lesson plans, student progress reports, and reminders via email and messaging platforms. It is easier to coordinate teaching activities and discuss challenges with other staff. Pupils also benefit because teachers can respond quickly to their needs and organize extra support sessions when necessary (Interviewed Academic Teacher from School B, October 2025).

The Academic Teacher's statement illustrated that digital communication tools strengthen teamwork and coordination among teaching staff, which indirectly supports pupil learning and classroom management. It also showed that when teachers collaborate efficiently using ICT, instructional quality and responsiveness improve.

The interviews from Schools C and B reinforced the quantitative findings that the use of data management and communication systems enhances administrative efficiency, collaboration, and support for teaching. Schools that effectively integrate these ICT tools create an environment where both teachers and pupils benefit from improved organization, timely reporting, and better instructional planning.

The implication of ICT communication tools on collaboration among administrative staff

The mean score of 3.83 shows that respondents generally agreed that ICT communication tools enhance collaboration. From table 1 the SD of 1.00 indicates relatively low variability. 48.9% agreed and 24.4% strongly agreed, while 2.2% strongly disagreed and 10.0% disagreed, with 14.4% remaining neutral. This suggests that most staff appreciate how ICT tools facilitate coordination, sharing of documents, and discussions, leading to smoother implementation of school policies and activities.

In addition to the statistical results, qualitative data from interviews helped to clarify how decision-making support tools influenced the monitoring of teaching and learning activities in schools. School leaders and pupils highlighted that ICT tools enabled more effective oversight of instructional practices and enhanced pupil engagement.

The Head Teacher from School B explained:

We use decision-support tools to monitor classroom performance and track pupils' progress. For example, the system shows attendance patterns, test results, and overall class performance, which helps me identify areas where teachers or pupils need additional support. It has made supervision easier and more focused because we can prioritize interventions based on real data rather than assumptions." (Interviewed Head Teacher from School B, October 2025).

This response highlighted the role of ICT-based decision-support systems in facilitating informed administrative decisions and improving the quality of teaching. The Head Teacher's remarks suggested that access to accurate and timely data helps school leaders target resources, support teachers, and enhance pupil learning outcomes.

Similarly, a pupil from School B shared their perspective:

I have noticed that our teachers sometimes check our performance on the computer before lessons. They know who needs extra help, and sometimes they arrange extra lessons or explain difficult topics again. It makes me feel like teachers are paying attention to everyone, and I try to do my best because they can see my progress." (Interviewed Pupil from School B, October 2025).

The pupil's statement illustrated that decision-support tools not only assist administrators but also influence pupil motivation and engagement. It revealed that pupils are aware of monitoring practices and respond positively when they perceive that teachers use data to support learning. The interviews from School B reinforced the quantitative findings that decision-making support tools are important for effective monitoring of teaching and learning. Schools that implement these systems create a structured and responsive learning environment, enhancing both instructional quality and pupil outcomes.

Implication of decision-making support tools in monitoring teaching and learning

A mean of 3.74 shows moderate agreement that decision-support tools aid monitoring of teaching and learning. From table 1 the SD of 1.13 reflects slightly higher variability. 43.3% agreed and 26.7% strongly agreed, while 5.6% strongly disagreed and 11.1% disagreed, with 13.3% neutral. This indicates that while most staff find decision-support tools useful for tracking student performance and teacher activities, some variation exists, possibly due to differences in access or familiarity with the tools.

In addition to the statistical results, qualitative data from interviews helped to clarify how ICT-based administration influenced transparency and accountability in school management. Head Teachers highlighted that the use of digital tools improved oversight of resource allocation, financial management, and general school operations.

The Head Teacher from School A explained:

Our school uses an ICT system to track resources, finances, and even attendance records. Everything is recorded digitally, which makes it easier to identify if materials are missing or if there are inconsistencies in reports. Teachers and staff know that their work is being monitored, and this has improved accountability. It also helps me prepare reports for the district quickly and accurately (Interviewed Head Teacher from School A, October 2025)

This response highlighted the role of ICT in promoting transparency and reducing mismanagement of school resources. The Head Teacher's remarks suggested that digital administration systems create a culture of responsibility among staff and support informed decision-making at the school level. Similarly, the Head Teacher from School B shared their perspective:

"We recently introduced an ICT-based administrative system to manage finances and school resources. It allows us to track how funds are used and ensures that all transactions are documented. Teachers and support staff are more careful in using resources because the system keeps accurate records. This has made our school operations more transparent and has built trust among staff and parents (Interviewed Head Teacher from School B, October 2025).

The Head Teacher's statement illustrated that ICT tools strengthen transparency and accountability by documenting processes and monitoring resource use. It also showed that effective ICT administration can enhance trust among stakeholders and improve overall school governance.

The interviews from Schools A and B reinforced the quantitative findings that ICT-based administration is a key factor in promoting transparency and accountability. Schools that integrate these systems can manage resources efficiently, ensure ethical practices, and create a positive environment where staff and pupils benefit from structured and responsible administrative processes.

ICT-based administration enhances transparency and accountability in resource use

The mean of 3.88 shows general agreement that ICT administration improves transparency and accountability. From table 1 the SD of 1.02 indicates moderate variability. 42.2% agreed and 30.0% strongly agreed, whereas 3.3% strongly disagreed and 7.8% disagreed, with 16.7% neutral. This highlights that most respondents perceive ICT systems as promoting fair, transparent, and accountable management of school resources.

In addition to the statistical results, qualitative data from interviews helped to clarify how ICT tools supported overall school administration and enhanced teaching and learning processes. Teachers, academic staff, and pupils emphasized that integrating ICT improved efficiency, communication, and instructional planning.

A teacher from School C explained:

ICT has really changed how we manage daily school activities. I can record attendance, track students' progress, and submit reports to the head teacher much faster than before. It has also made it easier to coordinate with other teachers when planning lessons. I feel that lessons run more smoothly now, and pupils benefit from the organized approach (Interviewed Teacher from School C, October 2025)

This response highlighted that ICT facilitates efficiency in administrative and teaching tasks. The teacher's remarks suggested that organized record-keeping and reporting help improve lesson delivery and ensure that pupils receive consistent support. Similarly, an Academic Teacher from School B shared their perspective:

Using ICT tools allows me to monitor teaching and learning across different classes. I can quickly analyse assessment results and see which pupils are struggling. This helps me guide teachers to provide extra support or adjust their lesson plans. Overall, it improves both teaching quality and student outcomes (Interviewed Academic Teacher from School B, October 2025)

The Academic Teacher's statement illustrated that ICT supports data-driven instructional decisions, enabling teachers to focus on areas where pupils need additional attention. It also indicated that administrative and academic coordination benefits from ICT, leading to improved learning outcomes. A pupil from School A expressed their view:

I like that our teachers use computers to keep track of our progress. They know if I am falling behind and sometimes give me extra exercises or explain things again. It makes me feel supported, and I try harder because I know the teachers can see how I am doing (Interviewed Pupil from School A, October 2025)

The pupil's statement showed that ICT not only supports teachers but also motivates learners. It revealed that when pupils perceive that their performance is monitored and supported through digital tools, they are more engaged and take greater responsibility for their learning. The interviews from Schools C, B, and A reinforced the quantitative findings that ICT adoption enhances administrative efficiency, instructional support, and pupil engagement. Schools that effectively integrate ICT create a well-organized environment where teachers can plan better, monitor performance, and provide targeted support, resulting in improved teaching and learning outcomes.

Discussion

The findings revealed that ICT integration significantly enhanced resource allocation and administrative efficiency in primary schools. ICT-based record-keeping improved accuracy and accountability by enabling precise tracking of teaching materials, finances, and attendance records, reducing errors and promoting transparency among teachers and pupils (Mensah & Boateng, 2021; Khan & Rahman, 2022; Chikondi, 2023; Alemayehu, 2022). Data management systems facilitated timely reporting, simplified data entry, and supported evidence-based decision-making, fostering collaboration among academic and administrative staff while reducing redundancies in communication (Yusuph & Oketch, 2022; Mugisha & Mtebe, 2023; Bakar & Idris, 2023; Ouma & Muwanga, 2021).

ICT-based communication tools further strengthened coordination among administrative staff, allowing real-time information sharing, joint problem-solving, and improved trust, which enhanced overall organizational efficiency (Kashorda & Njoroge, 2023; Lukman & Osei, 2021; Adebayo & Moyo, 2021; Mtebe, 2022). Decision-support systems enabled administrators to monitor teaching and learning effectively by providing real-time data on teacher performance, student attendance, and lesson coverage, thereby supporting fair and evidence-based interventions (Mushi & Kamara, 2023; Khan & Rahman, 2022; Alemayehu, 2024; Bakar & Idris, 2023). Overall, ICT-based administration promoted transparency and accountability in resource use, improving financial management, tracking resource utilization, and fostering stakeholder confidence in school governance (Chikondi, 2023; Kashorda & Njoroge, 2023; Ouma & Muwanga, 2021; Mtebe, 2022).

Conclusions and Recommendations

The study concluded that ICT integration in primary schools significantly enhances the accuracy, efficiency, and transparency of resource allocation. Digital record-keeping, data management systems, communication tools, and decision-support systems collectively improve administrative processes, facilitate evidence-based decision-making, and strengthen accountability in teaching, learning, and financial management. Schools that effectively adopt ICT demonstrate better coordination among staff, timely reporting, and equitable distribution of resources, ultimately promoting a more efficient and transparent educational environment.

The study recommended that primary schools continue to invest in ICT infrastructure, including computers, software, and reliable internet connectivity, to support resource management and administrative functions. Teachers and administrators should receive regular training on digital tools to maximize their effective use. Schools should also establish clear policies for ICT-based data management and decision-making to ensure transparency and accountability. Additionally, ongoing monitoring and evaluation of ICT systems should be conducted to identify challenges and optimize resource allocation for improved educational outcomes.

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